

Serial No. 10/673,339

Attorney Docket No. 02-102

**LISTING OF CLAIMS:**

1. (Currently amended) A commutator comprising:

a generally cylindrical dielectric body; and

a plurality of commutator segments arranged along an outer peripheral surface of the dielectric body, wherein:

each commutator segment includes at least one ridge, which extends in a direction generally parallel to an axial direction of the commutator and radially inwardly projects into the dielectric body to secure the commutator segment relative to the dielectric body;

each ridge includes a plurality of high projecting portions and a plurality of low projecting portions, wherein each high projecting portion has a projecting length, which is measured from a base end of the ridge in a projecting direction of the ridge and is longer than that of each low projecting portion;

the high projecting portions and the low projecting portions of each ridge are alternately arranged in a longitudinal direction of the ridge; and

at least one of the low projecting portions of each ridge has at least one protrusion, which protrudes in a transverse direction that is perpendicular to the longitudinal direction of the ridge;

at least each adjacent one of the high projecting portions of each ridge, which is adjacent to a corresponding one of the at least one of the low projecting portions of the ridge, includes:

at least one groove that is obliquely angled relative to the longitudinal direction of the ridge; and

at least one protrusion, each of which ~~that is~~ bound with a corresponding one of the at least one groove and protrudes in an imaginary plane generally perpendicular to the projecting

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direction of the ridge over a corresponding adjacent one of the at least one protrusion of the adjacent low projecting portion, so that a first space is defined on one side of the adjacent protrusion of the low projecting portion, and a second space is defined on the other side of the adjacent protrusion of the low projecting portion between the adjacent protrusion of the low projecting portion and the protrusion of the high projecting portion; and

at least a portion of the first space and at least a portion of the second space are placed along an imaginary line that is parallel to the projecting direction of the ridge.

2-5 (Canceled)

6. (Original) The commutator according to claim 1, wherein:

the at least one ridge of each commutator segment includes first and second ridges;

each low projecting portion of each of the first and second ridges includes first and second protrusions, which protrude away from each other in a circumferential direction of the dielectric body;

a protruding length of each first protrusion, which is measured in the circumferential direction of the dielectric body, is longer than that of each second protrusion;

each of the first protrusions of the first ridge and a corresponding one of the first protrusions of the second ridge protrude toward each other in the circumferential direction of the dielectric body; and

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each of the second protrusions of the first ridge and a corresponding one of the second protrusions of the second ridge protrude away from each other in the circumferential direction of the dielectric body.

7. (Original) The commutator according to claim 1, wherein each low projecting portion is recessed such that a bottom of the recessed low projecting portion, which has a deepest depth in the low projecting portion, is elongated in the longitudinal direction of the corresponding ridge.

8. (Original) The commutator according to claim 7, wherein the recessed low projecting portion is curved.

9. (Original) The commutator according to claim 7, wherein the recessed low projecting portion is V-shaped.

10. (Original) The commutator according to claim 1, wherein each low projecting portion is recessed such that a bottom of the recessed low projecting portion, which has a deepest depth in the low projecting portion, is elongated in a circumferential direction of the dielectric body.

11. (Original) The commutator according to claim 10, wherein the recessed low projecting portion is curved.

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12. (Original) The commutator according to claim 10, wherein the recessed low projecting portion is V-shaped.

13. (Original) The commutator according to claim 1, wherein:

each commutator segment further includes a commutator riser; and

each ridge of each commutator segment is spaced a predetermined distance from a base end of the commutator riser.

14-17 (Canceled)

18. (Currently amended) A commutator plate material comprising a plurality of parallel ridges, wherein:

each ridge includes a plurality of high projecting portions and a plurality of low projecting portions, wherein each high projecting portion has a projecting length, which is measured from a base end of the ridge in a projecting direction of the ridge and is longer than that of each low projecting portion;

the high projecting portions and the low projecting portions of each ridge are alternately arranged in a longitudinal direction of the ridge; and

at least one of the low projecting portions of each ridge has at least one protrusion, which protrudes in a transverse direction that is perpendicular to the longitudinal direction of the ridge;

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at least each adjacent one of the high projecting portions of each ridge, which is adjacent to a corresponding one of the at least one of the low projecting portions of the ridge, includes:

at least one groove that is obliquely angled relative to the longitudinal direction of the ridge; and

at least one protrusion, each of which that is bound with a corresponding one of the at least one groove and protrudes in an imaginary plane generally perpendicular to the projecting direction of the ridge over a corresponding adjacent one of the at least one protrusion of the adjacent low projecting portion, so that a first space is defined on one side of the adjacent protrusion of the low projecting portion, and a second space is defined on the other side of the adjacent protrusion of the low projecting portion between the adjacent protrusion of the low projecting portion and the protrusion of the high projecting portion; and

at least a portion of the first space and at least a portion of the second space are placed along an imaginary line that is parallel to the projecting direction of the ridge.

19. (Canceled)

20. (New) The commutator according to claim 1, wherein:

in a cross section taken along an imaginary plane that is perpendicular to the longitudinal direction of the ridge, the at least one of the low projecting portions of each ridge has a recess that extends in a direction opposite to the projecting direction of the ridge; and

the depth of the recess increases toward a center of the low projecting portion in the transverse direction.

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21. (New) The commutator according to claim 20, wherein the recessed cross-section of the at least one of the low projecting portions of each ridge is V-shaped.

22. (New) The commutator according to claim 20, wherein the recessed cross-section of the at least one of the low projecting portions of each ridge is curved.

23. (New) The commutator plate material according to claim 18, wherein:

in a cross section taken along an imaginary plane that is perpendicular to the longitudinal direction of the ridge, the at least one of the low projecting portions of each ridge has a recess that extends in a direction opposite to the projecting direction of the ridge; and

the depth of the recess increases toward a center of the low projecting portion in the transverse direction.

24. (New) The commutator plate material according to claim 23, wherein the recessed cross-section of the at least one of the low projecting portions of each ridge is V-shaped.

25. (New) The commutator plate material according to claim 23, the recessed cross-section of the at least one of the low projecting portions of each ridge is curved.